DOCUMENT RESUME

ED 305 034 IR 013 696

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TITLE Women and Artificial Intelligence. Report of an Open Day for Fifth And Lower Sixth Form Girls.
PUB DATE 86
NOTE 5p.
PUB TYPE Reports - Descriptive (141) -- Journal Articles (080)
JOURNAL CIT AISB Quarterly; v59 p9-12 1986

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Artificial Intelligence; *Career Awareness; Career Counseling; College Curriculum; *College Day; *Computer Science Education; *Females; Foreign Countries; Higher Education; Secondary Education
IDENTIFIERS England

ABSTRACT

This paper describes an open day held for fifth and lower sixth form girls which was designed to encourage them to consider pursuit of either a degree level program or coursework in artificial intelligence at the University of Sussex. It is noted that, although the students who attended the program were enthusiastic, the number of applicants was lower than had been expected. It is suggested that the low attendance was due in part to lack of encouragement by teachers. It is also suggested that the program ought to be longer in duration in order to provide more opportunities for hands-on experience. Finally, concern is expressed that the only female students who were interested in the program seemed to be students already considering study in science, technology, or mathematics, despite the fact that the Sussex program is interdisciplinary in nature and might be of interest to students still undecided about their career paths. (EW)

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ED305034

O'Malley, C.E. & Taylor, J.A.
1986

Ib1975
Women and artificial intelligence: report of an open day for fifth and lower sixth form girls
AISB Quarterly 59

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WOMEN AND ARTIFICIAL INTELLIGENCE

Report of an Open Day for Fifth and Lower Sixth Form Girls

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Introduction

"Do women merely use or do they actively control computers? For years women have done the washing and now use washing machines to do it, but they have never controlled the processes that went into producing these machines. They just used the output -- a deskilled, mostly unpaid, piece of work. Computing is thus part of the wider problem of encouraging women to believe that they can control science and technology themselves." (Pilley, 1985, p.29)

"While 75 to 100% of all workers at the lowest level of computing -- entering data -- are women, women in the highest levels, programmers (5 to 15%) and systems analysts (less than 5%) are rare indeed. The number of women engineers in Britain (1 in 300) is the lowest in the Western world." (Gerver, 1985, p.9)

Women should be encouraged to become the producers as well as the consumers of new technology. In order to get more women involved in designing, producing and controlling technology, they need to be encouraged into training courses. As Margaret Boden notes in her article, computers are often seen as machines to be used by scientists and mathematicians -- and usually by men. Boden also notes that, although we want to encourage women to do science and maths, computing is not essentially mathematical, so we cannot conclude that because women are loath to do maths or science they should be ill-at-ease with computers. In fact, Angela Bowey (1985)

IR013696

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notes that the usual stereotype doesn't apply to computers:

"Indeed computing probably conforms to the stereotype of what women are supposed to be good at -- requiring attention to detail, concentration and no great physical effort." (Bowey, 1985, p.5)

However, women are turning away from computers and computing. Bowey notes that girls are under-represented in computer courses at school level. This also appears to be the case for tertiary level; although I don't have any national figures, the figures at Sussex University seem to bear this out. The degree course in Artificial Intelligence has been running for three years now, but there is a downward trend in terms of numbers of female applicants.

Women And Artificial Intelligence: An Open Day For Schools

In the report mentioned above, Bowey recommends that schools and colleges should organise seminars, exhibitions or workshops to attract and introduce women and girls to computing. Last July, the Computing Studies Subject Group at the University of Sussex held an Open Day for fifth and lower sixth form schoolgirls, entitled "Women and Artificial Intelligence".

Concern had been expressed by the University's Computing Studies Subject Group at the falling number of female applicants for courses in Computing and Artificial Intelligence. It was decided that we should try to discriminate positively in favour of women by having an Open Day aimed at encouraging them to consider taking Artificial Intelligence and Computing courses at Sussex. (This coincided with a call from the University Admissions Committee for Subject Groups to run periodical residential conferences for sixth formers with the aim of introducing them to specific subjects within the discipline concerned.)

Although the major aim of the Open Day was to encourage women to consider taking Artificial Intelligence and Computing courses at degree level, we wanted particularly to address those pupils who were not already committed to computing as a career (in line with EOC recommendations). We felt that since many girls may associate computing with mathematics or engineering, they may not recognise the potential that a degree course in Artificial Intelligence can offer. As a result, we wanted to address those schoolgirls who were undecided about whether to pursue careers in Arts or Sciences.

The Artificial Intelligence major at Sussex University does not presume a background in programming, mathematics or computer science. A large part of the work is devoted to Philosophy, Linguistics and Psychology courses. Programming is used as a conceptual tool for exploring ideas about the mind. In addition, the computing component of the degree opens up many areas of future employment to students. We wanted to emphasise the fact that AI and Cognitive Studies could satisfy students' academic needs, whilst at the same time allow them to develop valuable job skills, enabling flexibility in career choices.

The Open Day was designed to introduce attendees to the very broad range of topics with which AI is concerned, both from an academic and an industrial/commercial point of view. Workshops were arranged to allow "hands-on" experience with AI programs, and discussion groups were held with other women currently working in the field.

We sent out letters to some 450 schools in Sussex, London, Hampshire and Kent. (The circulation was limited on the grounds that this was a one-day event, so long distance travel was ruled out.) Disappointingly, we received only 29 applications from a total of 13 schools. Even though we had informed schools that we could only cater for 30 pupils, this figure was way below our expectations. However, it did mean that no pupil was turned down because of numbers.

Although we were expecting 29 attendees, only 17 turned up on the day. (The possible reasons for this are discussed later on.) However, overall the day seemed very successful. The speakers provided a good balance between talking in some detail about their own work (e.g., vision, speech), and talking about how to succeed as women in a male-dominated environment.

The day began with an introductory talk on Artificial Intelligence and Cognitive Studies from Professor Margaret Boden, Dean of the School of Social Sciences at Sussex. Professor Boden spoke in particular about the role of women in computing and AI. Julie Rutkowska then talked more specifically about the courses offered at Sussex, including courses (such as Psychology) where students could take AI as a subsidiary course, as well as the AI major. Following the introductory talks, various female academics from Sussex spoke about their own research, which covered topics such as natural language, speech, children and computers, and human-computer interaction. The talks also covered more personal content concerning the route by which these women became involved in their various fields, and the problems they had encountered.

In order to give a balanced perspective on the field, speakers from industry and commerce had also been invited. These included Donia Scott (Philips Research Laboratories), who spoke about her research in natural language and speech understanding; Hilary Buxton (QMC -- formerly at GEC), who spoke about her work in vision; Caroline Knight (Hewlett-Packard), who gave a general overview of what it was like to work in an industrial setting; and Gilly Furze (Cognitive Applications -- a University-based AI company), who talked about working in a commercial setting.

During the day we also ran tutorial workshops to explore the nature of programming in Artificial Intelligence. Pupils were given demonstrations and "hands-on" experience of AI programs (involving some of the courseware used in the degree programme). We also had a Macintosh available for

demonstrating graphical interfaces and "WIMP" technology. The Alvey conference was on at the same time on campus, and pupils were given the opportunity to see the exhibitions, which included some of the Sussex-based Alvey and SERC AI projects.

Discussion and Feedback

At the end of the day, after the talks and demonstrations, we held an open discussion session, at which the visiting pupils were encouraged to ask questions and to give us feedback on what they thought of the day.

Several students expressed surprise at the wide-ranging nature of AI, and had clearly been concerned about narrowing their options by coming to University and specialising in a subject. AI seemed to represent a good alternative.

In the feedback session, we found that pupils enjoyed their day, and some wished that particular talks could have gone on longer (i.e., the vision and speech talks). One student in particular was very enthusiastic about doing an undergraduate course at Sussex. Several others agreed. About four or five pupils felt that they would like to study some other subject at undergraduate level (i.e., modern languages) but would consider doing AI at postgraduate level. The school teacher who accompanied one group also felt that the MSc Knowledge Based Systems conversion course would suit her. We have subsequently had several letters expressing enthusiasm for courses at Sussex.

Problems

Although the Open Day seemed to be a success overall, it was felt by some that not enough time was spent on practical work, or hands-on experience. There are some practical problems about what can be included in a one-day event. A longer residential course (2-3 days) might be run along similar lines to the AISB summer/autumn schools, with more intensive practical workshops, etc.

A more serious problem was the lack of response to our invitation (13 out of 450 schools) and attendance (17 out of 29 applicants). This lack of positive response has been found elsewhere. Gerver (1985) notes that the reluctance on the part of women to get involved with computers is not just reflected in their use:

"It is also reflected in a small number of girls who attend computer exhibitions, even when programmes designed specifically for women are featured..." (Gerver, 1985, p.9)

A report from a local newspaper notes:

"Only seven girls and two mothers turned up to a meeting ... run by the Women Into Science and Engineering (WISE) and Brighton College of Technology, compared with well over 100 at the campaign's launch last year [1984]." (Evening Argus, October 30th 1985)

The poor attendance was attributed to Brighton schools: a lecturer at the college was quoted as saying:

"None of the schools in Brighton ... seem to be encouraging any of their girls to take up science and engineering subjects..." (ibid.)

Most of the pupils who did attend our Open Day were taking either maths or computer science A-levels (or both) -- indeed 11 of the 13 who had chosen their A-level subjects were in this category. Where pupils had not yet chosen their A-level subjects they also mentioned being interested in maths and computer science.

This seemed to reflect another problem: most students heard about the Open Day from their maths or physics teachers. This was partly due to the fact that the standard list of addresses obtained from University Admissions are directed at head teachers rather than careers officers. It is difficult to know how to overcome this problem. Several attendees felt that head teachers would just see the title "Computing Studies Subject Group" and hand the information over to Computing Studies (which seems reasonable). In fact, when we applied to the University to run the Open Day, the senior assistant registrar cautioned us that the major difficulty would be to identify the best person in the school to whom to address the invitation (in the absence of an obvious subject specialist) in view of the "rather patchy response from Head and Careers Teachers in this context".

The title for the Open Day (Women and Artificial Intelligence) apparently caused some derision in the schools -- i.e., the old joke about women needing it and men not. Unfortunately, we did hear of one report of the teacher announcing the day publicly to the only female student in the class, and making this wisecrack himself! However, several girls indicated that had the title not included the words "artificial intelligence" they would not have come.

Despite poor attendance, we felt encouraged enough to consider running another course this year, possibly over two or three days this time. However, we feel that careful consideration must be given not only to the content of, and support materials for, a longer course (if it were to be residential), but to the kind of audience we would have. It is also difficult to know how to reach the right audience in the schools. The teachers who telephoned us were very enthusiastic and concerned that their girls should come, so it is not a question of apathy on the part of the schools and teachers. However, it is clear that most of the attendees on this Open Day were already involved in computing or maths. Leafing through the recommendations that the teachers wrote, it seems that they felt it important to mention that their girls were interested in "science" or "technology" or "computing", despite the fact that we had tried to stress the wide-ranging and interdisciplinary nature of the degree course at Sussex, and that we were particularly interested in girls who were undecided about doing Arts or Science at degree level. In order to overcome the preconceptions that the girls themselves have about computers (that they're "about maths" and "for the

boys"), it seems that we have to reach their teachers first.

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